E 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XB089]

Taking of Marine Mammals Incidental to Specific Activities; Taking of Marine Mammals Incidental to Pile Driving and Removal Activities during the Metlakatla Seaplane Facility Refurbishment Project, Metlakatla, Alaska

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible renewal.

SUMMARY: NMFS has received a request from the Alaska Department of Transportation and Public Facilities (AKDOT&PF) for authorization to take marine mammals incidental to pile driving/removal and down-the-hole drilling (DTH) activities during maintenance improvements to the existing Metlakatla Seaplane Facility (MSF) in Southeast Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-year renewal that could be issued under certain circumstances and if all requirements are met, as described in **Request for Public Comments** at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorizations and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be sent by electronic mail to *ITP.Egger@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments must not exceed a 25-megabyte file size, including all attachments. All comments received are a part of the public record and will generally be posted online at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection*-act without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Stephanie Egger, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*. In case of problems accessing these documents, or for anyone who is unable to comment via electronic mail, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the “take” of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed incidental take authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an IHA) with respect to potential impacts on the human environment. This action is consistent with categories of activities identified in Categorical Exclusion B4 (IHAs with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review.

We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On August 10, 2020, NMFS received a request from the AKDOT&PF for an IHA to take marine mammals incidental to pile driving/removal and DTH activities during maintenance improvements to the existing MSF in Southeast Alaska. The application was deemed adequate and complete on November 23, 2020. The applicant also provided an addendum to their application on February 23, 2021 for the addition of eight piles, some changes to their proposed shutdown zones, and minor changes to their take estimates due to the increase of in-water work days from the eight additional piles. The applicant's request is for take of eight species of marine mammals by Level B harassment only. Neither the AKDOT&PF nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

The purpose of this project is to make repairs to the MSF. The existing facility has experienced deterioration in recent years and AKDOT&PF has conducted several repair projects. The facility is near the end of its useful life, and replacement of all the existing float structures is required to continue safe operation in the future.

Dates and Duration

The applicant is requesting an IHA to conduct pile driving/removal and DTH over two months (approximately 26 working days) beginning in August 2021. Pile installation and removal will be intermittent during this period, depending on weather, construction and mechanical delays, protected species shutdowns, and other potential delays and logistical constraints. Pile installation will occur intermittently during the work period, for durations of minutes to hours at a time. Approximately 18 days of pile installation and

8 days of pile removal will occur using vibratory and impact pile driving and some DTH to stabilize the piles. These are discussed in further detail below. The total construction duration accounts for the time required to mobilize materials and resources and construct the project.

Specific Geographic Region

The proposed project in Metlakatla is located approximately 24 kilometers (km) (15 miles (mi)) south of Ketchikan, in Southeast Alaska. Metlakatla, is on Annette Island, in the Prince of Whales-Hyder Census Area of Southeast Alaska. The Metlakatla Seaplane Facility is centrally located in the village of Metlakatla on the south shore of Port Chester (Figure 1) within Section 5, Township 78 South, Range 92 East of the Copper River Meridian; United States Geological Survey Quad Map Ketchikan A-5; Latitude 55° 7' 50.30" North, 131° 34' 28.08" West.

Port Chester is a bay located on the east shore of Nichols Passage and on the west side of

Annette Island. Port Chester contains numerous small islands and reefs. The bay is one of many that lead to a larger system of glacial fjords connecting various channels with the open

ocean via Nichol's Passage, Clarence Strait, and Dixon Entrance. Port Chester is generally

characterized by semidiurnal tides with mean tidal ranges of more than 5 meters (m) (16 feet (ft)). Freshwater inputs to Port Chester originate from Trout Lake, Melanson Lake, Chester Lake, and other minor drainages from Annette Island. Three anadromous streams terminate in Port

Chester: Hemlock Creek, Trout Lake Creek, and an unnamed creek that originates from Melanson Lake (Giefer and Blossom 2020). The bathymetry of the bay is variable depending on location and proximity to shore, islands, or rocks. Depths approach 107 to 122 m (350 to 400 ft) on the west side of the bay near Nichols Passage. Nichols Passage is a wide and deep channel that runs between Gravina Island and Annette Island. Depths can exceed 305 m (1,000 ft) towards the south end of the channel.

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Figure 1--Project Location, Metlakatla, Alaska

Detailed Description of Specific Activity

Proposed activities included as part of the project with potential to affect marine mammals include the noise generated by vibratory removal of steel pipe piles, vibratory and impact installation of steel pipe piles, and DTH to stabilize piles. Pile removal will be conducted using a vibratory hammer. Pile installation will be conducted using both a vibratory and impact hammer and DTH pile installation methods. Piles will be advanced to refusal using a vibratory hammer. After DTH pile installation, the final approximately 10 ft of driving will be conducted using an impact hammer so that the structural capacity of the pile embedment can be verified. The pile installation methods used will depend on sediment depth and conditions at each pile location. Pile installation and removal will occur in waters approximately 6 - 7 m (20 - 23 ft) in depth.

The project will involve the removal of 11 existing steel pipe piles (16-inch (in) diameter) that support the existing multiple-float structure. The multiple-float timber structure, which covers 8,600 square ft, will also be removed. A new 4,800-square-ft single-float timber structure will be installed in the same general location. Six 24-in diameter steel pipe piles will be installed to act as restraints for the new seaplane float. In addition, 12 temporary 24-in steel

piles will be installed to support pile installation and removed following completion of construction.

DTH pile installation involves drilling rock sockets into the bedrock to support installation of the 6 permanent piles and 12 temporary piles. Rock sockets consist of inserting the pile in a drilled hole into the underlying bedrock after the pile has been driven through the overlying softer sediments to refusal by vibratory or impact methods. The pile is advanced farther into this drilled hole to properly secure the bottom portion of the pile into the rock. The depth of the rock socket varies, but 10–15 ft is commonly required. The diameter of the rock socket is slightly larger than the pile being driven.

Rock sockets are constructed using a DTH device with both rotary and percussion-type actions. Each device consists of a drill bit that drills through the bedrock using both rotary and pulse impact mechanisms. This breaks up the rock to allow removal of the fragments and insertion of the pile. The pile is usually advanced at the same time that drilling occurs. Drill cuttings are expelled from the top of the pile using compressed air. It is estimated that drilling rock sockets into the bedrock will take about 1–3 hours (hrs) per pile.

Tension anchors will be installed in each of the six permanent piles. Tension anchors are installed within piles that are drilled into the bedrock below the elevation of the pile tip after the pile has been driven through the sediment layer to refusal. A 6- or 8-in diameter steel pipe casing will be inserted inside the larger diameter production pile. A rock drill will be inserted into the casing, and a 6- to 8-in diameter hole will be drilled into bedrock with rotary and percussion drilling methods. The drilling work is contained within the steel pile casing and the steel pipe pile. The typical depth of the drilled hole varies, but 20–30 ft is common. Rock fragments will be removed through the top of the casing with compressed air. A steel rod will then be grouted into the drilled hole and affixed to the top of the pile. The purpose of a tension anchor is to secure the pile to the bedrock to withstand uplift forces. It is estimated that tension anchor installation will take about 1–2 hrs per pile.

No concurrent pile driving is anticipated for this project.

Please see Table 1 below for the specific amount of time required to install and remove piles.

Table 1--Pile driving and removal activities

Pile Diameter and Type	Number of Piles	Rock Sockets	Tension Anchors	Impact Strikes per Pile (duration in minutes)	Vibratory Duration per Pile (minutes)	DTH Pile Installation (Rock Socket) Duration per pile (minutes)	DTH Pile Installation (Tension Anchor) Duration per Pile (minutes)	Total Duration of Activity per pile (hours)	Piles per Day (Range)	Total Days
Pile Installation										
24-in Steel Plumb Piles (Permanent)	4	4	4	20 (15)	15	180	120	5.5	0.5 (0-1)	8
24-in Steel Batter Piles (Permanent)	2	2	2	20 (15)	15	90	120	4	0.5 (0-1)	4
24-in Steel Piles (Temporary)	12	12	0	20 (15)	15	60	N/A	1.5	2 (1-3)	6
Pile Removal										
16-in Steel Piles	11	N/A	N/A	N/A	30	N/A	N/A	0.5	3 (2-4)	4
24-in Steel Piles (Temporary)	12	N/A	N/A	N/A	30	N/A	N/A	0.5	3 (2-4)	4
TOTALS	29	18	6	N/A	N/A	N/A	N/A	N/A	N/A	26

Note: DTH = down-the-hole; N/A = not applicable

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Proposed Mitigation** and **Proposed Monitoring and Reporting**).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs;

https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS's website (*https://www.fisheries.noaa.gov/find*-species).

Table 2 lists all species or stocks for which take is expected and proposed to be authorized for this action, and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2020). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. Pacific and Alaska SARs (Carretta *et al*., 2020; Muto *et al*., 2020). All MMPA stock information presented in Table 2 is the most recent available at the time of publication and is available in the 2019 SARs (Caretta *et al.*, 2020; Muto *et al.*, 2020) and draft 2020 SARs (available online at: www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports).

Table 2--Marine Mammal Occurrence in the Project Area

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenopteridae (rorquals)						
Minke Whale	*Balaenoptera acutorostrata*	Alaska	-, -, N	N/A (see SAR, N/A, see SAR)	UND	0
Humpback Whale	*Megaptera novaeangliae*	Central N Pacific	-, -, Y	10,103 (0.3, 7,891, 2006)	83	26
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer Whale	*Orcinus orca*	Alaska Resident	-, -, N	2,347 (N/A, 2347, 2012)	24	1
		Northern Resident	-, -, N	302 (N/A, 302, 2018)	2.2	0.2
		West Coast Transient	-, -, N	349 (N/A,349; 2018)	3.5	0.4
Pacific White-Sided Dolphin	*Lagenorhynchus obliquidens*	N Pacific	-, -, N	26,880 (N/A, N/A, 1990)	UND	0
Family Phocoenidae (porpoises)						
Dall's Porpoise	*Phocoenoides dalli*	AK	-, -, N	83,400 (0.097, N/A, 1991)	UND	38
Harbor Porpoise	*Phocoena phocoena*	Southeast Alaska Inland waters	-, -, Y	see SAR (see SAR, see SAR, 2012)	see SAR	34
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Steller sea lion	*Eumetopias jubatus*	Eastern DPS	T, D, Y	43,201 a (see SAR, 43,201, 2017)	2592	112
Family Phocidae (earless seals)						
Harbor Seal	*Phoca vitulina*	Clarence Strait	-, -, N	27,659 (see SAR, 24,854, 2015)	746	40

[1] - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.
[2]- NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.* CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable [explain if this is the case]
[3] - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

As indicated above, all eight species (with 10 managed stocks) in Table 2 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we have proposed authorizing it.

Minke whale

In the North Pacific Ocean, minke whales occur from the Bering and Chukchi seas south to near the Equator (Leatherwood *et al*., 1982). In the northern part of their range, minke whales are believed to be migratory, whereas, they appear to establish home ranges in the inland waters of Washington and along central California (Dorsey *et al*. 1990). Minke whales are observed in Alaska's nearshore waters during the summer months (National Park Service (NPS) 2018). Minke whales are usually sighted individually or in small groups of 2-3, but there are reports of loose aggregations of hundreds of animals (NMFS 2018d).

No abundance estimates have been made for the number of minke whales in the entire North Pacific. However, some information is available on the numbers of minke whales in some areas of Alaska. Line-transect surveys were conducted in shelf and nearshore waters (within 30-45 nautical mi of land) in 2001-2003 from the Kenai Fjords in the Gulf of Alaska to the central Aleutian Islands. Minke whale abundance was estimated to be 1,233 (CV = 0.34) for this area (Zerbini *et al*., 2006). This estimate has also not been corrected for animals missed on the trackline. The majority of the sightings were in the Aleutian Islands, rather than in the Gulf of Alaska, and in water shallower than 200 m. So few minke whales were seen during three offshore Gulf of Alaska surveys for cetaceans in 2009, 2013, and 2015 that a population estimate for this species in this area could not be determined (Rone *et al*., 2017). Anecdotal observations suggest that minke whales do not enter Port Chester, and so are expected to occur rarely in the project area (L. Bethel, personal communication, June 11, 2020 as cited in the application). In nearby Tongass Narrows, NMFS estimated an occurrence rate of three individuals every

4 months (85 FR 673) based on Freitag, 2017 (as cited in 83 FR 37473). A recent monitoring report for Tongass Narrows reported no sightings of minke whales in May 2021 (report available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-department-transportation-ferry-berth-improvements*).

Humpback whale

The humpback whale is distributed worldwide in all ocean basins and a broad geographical range from tropical to temperate waters in the Northern Hemisphere and from tropical to near-ice-edge waters in the Southern Hemisphere. The humpback whales that forage throughout British Colombia and Southeast Alaska undertake seasonal migrations from their tropical calving and breeding grounds in winter to their high-latitude feeding grounds in summer. They may be seen at any time of year in Alaska, but most animals winter in temperate or tropical waters near Hawaii. In the spring, the animals migrate back to Alaska where food is abundant. The Central North Pacific stock of humpback whales are found in the waters of Southeast Alaska and consist of two distinct population segments (DPSs), the Hawaii DPS and the Mexico DPS (Mexico DPS listed under the ESA as threatened).

Within Southeast Alaska, humpback whales are found throughout all major waterways and in a variety of habitats, including open-ocean entrances, open-strait environments, near-shore waters, area with strong tidal currents, and secluded bays and inlets. They tend to concentrate in several areas, including northern Southeast Alaska. Patterns of occurrence likely follow the spatial and temporal changes in prey abundance and distribution with humpback whales adjusting their foraging locations to areas of high prey density (Clapham 2000). While many humpback whales migrate to tropical calving and breeding grounds in winter, they have been observed in Southeast Alaska in all months of the year (Bettridge *et al*., 2015).

No systematic studies have documented humpback whale abundance near Metlakatla.

Anecdotal information from Metlakatla and Ketchikan suggest that humpback whales' utilization of the area is intermittent year-round. Their abundance, distribution, and occurrence are dependent on and fluctuate with fish prey. Local mariners estimate that one to two humpback whales may be present in the Port Chester area on a daily basis during summer months (L. Bethel, personal communication, June 11, 2020 as cited in the application). This is consistent with reports from nearby Tongass Narrows, which suggest that humpback whales occur alone or in groups of two or three individuals about once a week (Freitag 2017 as cited in 85 FR 673). Therefore, in nearby Tongass Narrows, NMFS estimated that approximately four humpback whales may transit through each week (85 FR 673). A recent monitoring report for Tongass Narrows reported 9 individual sightings of humpback whales with 6 Level B harassment takes of humpback whales in May 2021(report available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-department-transportation-ferry-berth-improvements*). Anecdotal reports suggest that humpback whale abundance is higher and occurrence is more regular in Metlakatla.

On April 21, 2021, a final rule designating critical habitat for humpback whales was published in the **Federal Register** (86 FR 21082), however, no critical habitat for Mexico DPS humpback whales is within or near the project area.

Killer whale

Killer whales have been observed in all oceans and seas of the world, but the highest densities occur in colder and more productive waters found at high latitudes.

Killer whales are found throughout the North Pacific and occur along the entire Alaska coast, in British Columbia and Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (NMFS 2018f).

The Alaska Resident stock occurs from Southeast Alaska to the Aleutian Islands and Bering Sea. The Northern Resident stock occurs from Washington State through part of Southeast Alaska; and the West Coast Transient stock occurs from California through Southeast Alaska (Muto *et al*., 2018) and are thought to occur frequently in Southeast Alaska (Straley 2017).

Transient killer whales hunt and feed primarily on marine mammals, while residents forage primarily on fish. Transient killer whales feed primarily on harbor seals, Dall's porpoises, harbor porpoises, and sea lions. Resident killer whale populations in the eastern North Pacific feed mainly on salmonids, showing a strong preference for Chinook salmon (NMFS 2016a).

No systematic studies of killer whales have been conducted in or around Port Chester.

Dahlheim *et al*. (2009) observed transient killer whales within Lynn Canal, Icy Strait, Stephens

Passage, Frederick Sound, and upper Chatham Strait. Anecdotal local information suggests

that killer whales are rarely seen within the Port Chester area, but may be present more frequently in Nichols Passage and other areas around Gravina Island (L. Bethel, personal communication, June 11, 2020 as cited in the application). In nearby Tongass Narrows, NMFS estimated that one pod of 12 killer whales may be present each month, and two pods of 12 animals during May, June, and July based on killer whales generally just transiting through Tongass Narrows, and not lingering in the project area. Killer whales are observed on average about once every 2 weeks, and abundance increases between

May and July (as cited in Freitag 2017 in 85 FR 673). A recent monitoring report for Tongass Narrows reported 10 individuals sighted and 10 Level B harassment takes of killer whales during May 2021 (report available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-department-transportation-ferry-berth-improvements*).

Pacific white-sided dolphin

Pacific white-sided dolphins are a pelagic species. They are found throughout the temperate North Pacific Ocean, north of the coasts of Japan and Baja California, Mexico (Muto *et al*., 2018). They are most common between the latitudes of 38° North and 47° North (from California to Washington). The distribution and abundance of Pacific white-sided dolphins may be affected by large-scale oceanographic occurrences, such as El Niño, and by underwater acoustic deterrent devices (NPS 2018a).

Scientific studies and data are lacking relative to the presence or abundance of Pacific white-sided dolphins in or near Nichols Passage. Although they generally prefer deeper and more offshore waters, anecdotal reports suggest that Pacific white-sided dolphins have previously
been observed in Nichols Passage, although they have not been observed in Nichols Passage
or nearby inter-island waterways for 15 to 20 years. When Pacific white-sided dolphins have
been observed, sighting rates were highest in spring and decreased throughout summer and fall
(Dahlheim *et al*., 2009). Most observations of Pacific white-sided dolphins occur off the outer coast or in inland waterways near entrances to the open ocean. According to Muto *et al*. (2018), aerial surveys in 1997 sighted one group of 164 Pacific white-sided dolphins in Dixon entrance to the south of Metlakatla. Surveys in April and May from

1991 to 1993 identified Pacific white-sided dolphins in Revillagigedo Channel, Behm Canal, and Clarence Strait (Dahlheim and Towell 1994). These areas are contiguous with the open ocean waters of Dixon Entrance. These observational data, combined with anecdotal information, indicate that there is a small potential for Pacific white-sided dolphins to occur in the Project area. In nearby Tongass Narrows, NMFS estimated that one group of 92 Pacific white-sided dolphin may occur over a period of 1 year (85 FR 673), based on the median between 20 and 164 Pacific-white sided dolphins (Muto *et al*., 2018). A recent monitoring report for Tongass Narrows reported no sighting of Pacific white-sided dolphins in May 2021 (report available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-department-transportation-ferry-berth-improvements*).

Dall's Porpoise

Dall's porpoises are widely distributed across the entire North Pacific Ocean. They show some migration patterns, inshore and offshore and north and south, based on morphology and type, geography, and seasonality (Muto *et al*., 2018). They are common in most of the larger, deeper channels in Southeast Alaska and are rare in most narrow waterways, especially those that are relatively shallow and/or with no outlets (Jefferson *et al*., 2019). In Southeast Alaska, abundance varies with season.

Jefferson *et al*. (2019) recently published a report with survey data spanning from 1991 to 2012 that studied Dall's porpoise density and abundance in Southeast Alaska. They found Dall's porpoise were most abundant in spring, observed with lower numbers in summer, and lowest in fall. Their relative rarity is supported by Jefferson *et al*. (2019) presentation of historical survey data showing very few sightings in the Ketchikan area (north of Metlakatla) and conclusion that Dall's porpoise generally are rare in narrow waterways.

No systematic studies of Dall's porpoise abundance or distribution have occurred in Port Chester or Nichols Passage; however, Dall's porpoises have been consistently observed in Lynn Canal, Stephens Passage, upper Chatham Strait, Frederick Sound, and Clarence Strait (Dahlheim *et al*. 2009). The species is generally found in waters in excess of 183 m (600 ft) deep, which do not occur in Port Chester. Despite generalized water depth preferences, Dall's porpoises may occur in shallower waters. Moran *et al*. (2018) recently mapped Dall's porpoise distributions in bays, shallow water, and nearshore areas of Prince William Sound, habitats not typically utilized by this species. If Dall's porpoises occur in the project area, they will likely be present in March or April, given the strong seasonal patterns observed in nearby areas of Southeast Alaska (Dahlheim *et al*. 2009). Dall's porpoises are seen once a month or less within Port Chester and Nichols Passage in groups of less than 10 animals (L. Bethel, personal communication, June 11, 2020 as cited in the application). In nearby Tongass Narrows, NMFS estimated that 15 Dall's porpoises per month may be present based on local reports of Dall's porpoises typically occuring in groups of 10-15 animals in the area of Ketchikan (Freitag 2017 cited in 85 FR 673). A recent monitoring report for Tongass Narrows reported no sighting of Dall's porpoise in May 2021(report available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-department-transportation-ferry-berth-improvements*).

Harbor Porpoise

In the eastern North Pacific Ocean, the Bering Sea and Gulf of Alaska harbor porpoise stocks range from Point Barrow, along the Alaska coast, and the west coast of North America to Point Conception, California. The Southeast Alaska stock ranges from Cape Suckling, Alaska to the northern border of British Columbia. Within the inland waters of Southeast Alaska, harbor porpoises' distribution is clustered with greatest densities observed in the Glacier Bay/Icy Strait region and near Zarembo and Wrangell Islands and the adjacent waters of Sumner Strait (Dahlheim *et al*., 2015).

There is no official stock abundance associated with the SARs for harbor porpoise. Both aerial and vessel based surveys have been conducted for this species. Aerial surveys of this stock were conducted in June and July 1997 and resulted in an observed abundance estimate of 3,766 harbor porpoise (Hobbs and Waite 2010) and the surveys included a subset of smaller bays and inlets. Correction factors for observer perception bias and porpoise availability at the surface were used to develop an estimated corrected abundance of 11,146 harbor porpoise in the coastal and inside waters of Southeast Alaska (Hobbs and Waite 2010). Vessel based spanning the 22-year study (1991-2012) found the relative abundance of harbor porpoise varied in the inland waters of Southeast Alaska. Abundance estimated in 1991-1993 (N = 1,076; percent CI = 910-1,272) was higher than the estimate obtained for 2006-2007 (N = 604; 95 percent CI = 468-780) but comparable to the estimate for 2010-2012 (N = 975; 95 percent CI = 857-1,109; Dahlheim *et al*., 2015). These estimates assume the probability of detection directly on the trackline to be unity (g(0) = 1) because estimates of g(0) could not be computed for these surveys. Therefore, these abundance estimates may be biased low to an unknown degree. A range of possible g(0) values for harbor porpoise vessel surveys in other regions is 0.5-0.8 (Barlow 1988, Palka 1995), suggesting that as much as 50 percent of the porpoise can be missed, even by experienced observers.

Further, other vessel based survey data (2010-2012) for the inland waters of Southeast Alaska, calculated abundance estimates for the concentrations of harbor porpoise in the northern and southern regions of the inland waters (Dahlheim *et al*. 2015). The resulting abundance estimates are 398 harbor porpoise (CV = 0.12) in the northern inland waters (including Cross Sound, Icy Strait, Glacier Bay, Lynn Canal, Stephens Passage, and Chatham Strait) and 577 harbor porpoise (CV = 0.14) in the southern inland waters (including Frederick Sound, Sumner Strait, Wrangell and Zarembo Islands, and Clarence Strait as far south as Ketchikan). Because these abundance estimates have not been corrected for g(0), these estimates are likely underestimates.

The vessel based surveys are not complete coverage of harbor porpoise habitat and not corrected for bias and likely underestimate the abundance. Whereas, the aerial survey in 1997, although outdated, had better coverage of the range and is likely to be more of an accurate representation of the stock abundance (11,146 harbor porpoise) in the coastal and inside waters of Southeast Alaska. Although there have been no systematic studies or observations of harbor porpoises specific to Port Chester or Nichols Passage, there is potential for them to occur within the project area. Approximately one to two groups of harbor porpoises are observed each week in group sizes of up to 10 animals around Driest Point, located 5 km (3.1 mi) north of the Project location (L. Bethel, personal communication, June 11, 2020 as cited in the application). Their small overall size, lack of a visible blow, low dorsal fins and overall low profile, and short surfacing time make harbor porpoises difficult to spot (Dahlheim *et al*. 2015), likely reducing identification and reporting of this species, and these estimates therefore may be low. Harbor porpoises prefer shallower waters (Dahlheim *et al*. 2015) and generally are not attracted to areas with elevated levels of vessel activity and noise such as Port Chester. In nearby Tongass Narrrows, NMFS estimated that two groups of five harbor porpoises per month could be present (85 FR 673) based on local reports that harbor porpoises typically occur in groups of one to five animals and pass through in the area of Ketchikan 0-1 times a month (Freitag 2017 as cited in 85 FR 673). A recent monitoring report for Tongass Narrows reported no sighting of harbor porpoise in May 2021 (report available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-department-transportation-ferry-berth-improvements*).

Harbor Seal

Harbor seals range from Baja California north along the west coasts of Washington, Oregon, California, British Columbia, and Southeast Alaska; west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands; and north in the Bering Sea to Cape Newenham and the Pribilof Islands. They haul out on rocks, reefs, beaches, and drifting glacial ice and feed in marine, estuarine, and occasionally fresh waters. Harbor seals are generally non-migratory and, with local movements associated with such factors as tide, weather, season, food availability and reproduction.

The Clarence Strait stock of harbor seals is present within the project area. Harbor seals are commonly sighted in the waters of the inside passages throughout Southeast Alaska. Surveys in 2015 estimated 429 (95% Confidence Interval (CI): 102–1,203) harbor seals on the northwest coast of Annettte Island, between Metlakatla and Walden Point. An additional 90 (95% CI: 18–292) were observed along the southwest coast of Annette Island, between Metlakatla and Tamgas Harbor (NOAA 2019). The Alaska Fisheries Science Center identifies three haulouts in Port Chester (1.5-1.8 mi from Metlakatla) and three additional haulouts north of Driest Point (3+ mi from Metlakatla) (see Figure 4-2 of the application). Abundance estimates for these haulouts are not available, but they are all denoted as having had more than 50 harbor seals at one point in time (NOAA 2020). However, local biologists report only small numbers (fewer than 10) of harbor seals are regularly observed in Port Chester. As many as 10 to 15 harbor seals may utilize Sylburn Harbor, located 6 km (3.7 mi) north of Metlakatla across Driest Point

(R. Cook, personal communication, June 5, 2020 as cited in the application), as a haulout location. In nearby Tongass Narrows, NMFS estimated that two groups of three harbor seals would be present every day (85 FR 673) based on based on local reports that harbor seals typically occur in groups of one to three animals and occur every day of the month in the area of Ketchikan (Freitag 2017 as cited in 85 FR 673). A recent monitoring report for Tongass Narrows reported 28 individual sighting of harbor seals with 18 takes by Level B harassment in May 2021 *(report available at https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-department-transportation-ferry-berth-improvements*). Harbor seals are known to be curious and may approach novel activity, so it is possible some may enter the project area during pile driving activities.

Steller Sea Lion

Steller sea lions range along the North Pacific Rim from northern Japan to California, with centers of abundance in the Gulf of Alaska and Aleutian Islands (Loughlin *et al*., 1984).

Of the two Steller sea lion populations in Alaska, the Eastern DPS includes sea lions born on rookeries from California north through Southeast Alaska and the Western DPS includes those animals born on rookeries from Prince William Sound westward, with an eastern boundary set at 144° W (NMFS 2018h). Only Eastern DPS Steller sea lions are considered in this application as Western DPS Steller sea lions are not typically found south of Sumner Strait. Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the breeding season (late-May to early-July), leading to intermixing of stocks (Jemison *et al*. 2013; Allen and Angliss 2015).

Steller sea lions are common in the inside waters of Southeast Alaska. They are residents of the project vicinity and are common year-round in the action area, moving their haulouts based on seasonal concentrations of prey from exposed rookeries nearer the open Pacific Ocean during the summer to more protected sites in the winter (Alaska Department of Fish & Game (ADF&G) 2018).

Steller sea lions are common within the project area; however, systematic counts or surveys have not been completed in the area directly surrounding Metlakatla. Three haulouts are located within 150 km (93 mi) of the project area (Fritz *et al*. 2016a; see Figure 4-1 of the application); the nearest documented haulout is West Rock, about 45 km (28 mi) south of Metlakatla. West Rock had a count of 703 individuals during a June 2017 survey and 1,101 individuals during a June 2019 survey (Sweeney *et al*. 2017, 2019). Aerial surveys occurred intermittently between 1994 and 2015, and averaged 982 adult Steller sea lions (Fritz *et al*. 2016b). Anecdotal evidence provided by local captains and biologists indicate that 3 to 4 Steller sea lions utilize a buoy as a haulout near the entrance of Port Chester, about 3.2 km (2 mi) from the project area (L. Bethel, personal communication, June 11, 2020 2020 as cited in the application). Steller sea lions are not known to congregate near the cannery in Metlakatla. In nearby Tongass Narrows, NMFS estimated that one group of 10 Steller sea lions could be present each day, and double that rate during herring and salmon runs in March through May and July through September (85 FR 673) based on local reports of Steller sea lions typically occurring in groups of 1-10 animals and every day of the month in the area of Ketchikan (Freitag 2017 as cited in 85 FR 673). A recent monitoring report for Tongass Narrows reported 41 individual sightings of Steller sea lions with 9 takes by Level B harassment in May 2021 (report available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-alaska-department-transportation-ferry-berth-improvements*). Local observations in Metlakatla suggest that the species assemblages and abundance in Metlakatla are similar to Tongass Narrows.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 3.

Table 3--Marine Mammal Hearing Groups (NMFS, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, *Kogia*, river dolphins, cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz

* Represents the generalized hearing range for the entire group as a composite (*i.e.*, all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al*. 2007) and PW pinniped (approximation).

The pinniped functional hearing group was modified from Southall *et al*. (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al*., 2006; Kastelein *et al*., 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. Eight marine mammal species (six cetacean and two pinniped (one otariid and one phocid) species) have the reasonable potential to occur during the proposed activities. Please refer to Table 2. Of the cetacean species that may be present, two are classified as low-frequency cetaceans (*i.e*., all mysticete species), two are classified as mid-frequency cetaceans (*i.e*., all delphinid species), and two are classified as high-frequency cetaceans (*i.e*., porpoise).

Potential Effects of Specified Activities on Marine Mammals and their Habitat

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The **Estimated Take** section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The **Negligible Impact Analysis and Determination** section considers the content of this section, the **Estimated**

Take section, and the **Proposed Mitigation** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

Acoustic effects on marine mammals during the specified activity can occur from vibratory and impact pile driving as well as during DTH of the piles. The effects of underwater noise from the AKDOT&PF's proposed activities have the potential to result in Level B behavioral harassment of marine mammals in the vicinity of the action area.

Description of Sound Sources

This section contains a brief technical background on sound, on the characteristics of certain sound types, and on metrics used in this proposal inasmuch as the information is relevant to the specified activity and to a discussion of the potential effects of the specified activity on marine mammals found later in this document. For general information on sound and its interaction with the marine environment, please see, *e.g.*, Au and Hastings (2008); Richardson *et al*. (1995); Urick (1983).

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the "loudness" of a sound and is typically described using the relative unit of the decibel (dB). A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure (for underwater sound, this is 1 microPascal (μPa)), and is a logarithmic unit that accounts for large variations in amplitude; therefore, a relatively small change in dB corresponds to large changes in sound pressure. The source level (SL) represents the SPL referenced at a distance of 1 m from the source (referenced to 1 μPa), while the received level is the SPL at the listener's position (referenced to 1 μPa).

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Root mean square is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Root mean square accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

Sound exposure level (SEL; represented as dB re 1 μPa^2-s) represents the total energy in a stated frequency band over a stated time interval or event, and considers both intensity and duration of exposure. The per-pulse SEL is calculated over the time window containing the entire pulse (*i.e.*, 100 percent of the acoustic energy). SEL is a cumulative metric; it can be accumulated over a single pulse, or calculated over periods containing multiple pulses. Cumulative SEL represents the total energy accumulated by a receiver over a defined time window or during an event. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source, and is represented in the same units as the rms sound pressure.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in a manner similar to ripples on the surface of a pond and may be either directed in a beam or beams or may radiate in all directions (omnidirectional sources), as is the case for sound produced by the pile driving activity considered here. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound, which is defined as environmental background sound levels lacking a single source or point (Richardson *et al*., 1995). The sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.*, wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.*, sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.*, vessels, dredging, construction) sound. A number of sources contribute to ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kilohertz (kHz) (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of ambient sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total ambient sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly.

The sum of the various natural and anthropogenic sound sources that comprise ambient sound at any given location and time depends not only on the source levels (as determined by current weather conditions and levels of biological and human activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10-20 decibels (dB) from day to day (Richardson *et al*., 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

Sounds are often considered to fall into one of two general types: pulsed and non-pulsed (defined in the following). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g*., Ward, 1997 in Southall *et al*., 2007). Please see Southall *et al*. (2007) for an in-depth discussion of these concepts. The distinction between these two sound types is not always obvious, as certain signals share properties of both pulsed and non-pulsed sounds. A signal near a source could be categorized as a pulse, but due to propagation effects as it moves farther from the source, the signal duration becomes longer (*e.g.*, Greene and Richardson, 1988).

Pulsed sound sources (*e.g.*, airguns, explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986, 2005; Harris, 1998; NIOSH, 1998; ISO, 2003) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or intermittent (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.*, rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

The impulsive sound generated by impact hammers is characterized by rapid rise times and high peak levels. Vibratory hammers produce non-impulsive, continuous noise at levels significantly lower than those produced by impact hammers. Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (*e.g.*, Nedwell and Edwards, 2002; Carlson *et al*., 2005). DTH is believed to produce sound with both impulsive and continuous characteristics (*e.g.*, Denes et al., 2016).

Acoustic Effects on Marine Mammals

We previously provided general background information on marine mammal hearing (see **Description of Marine Mammals in the Area of Specified Activities**).

Here, we discuss the potential effects of sound on marine mammals.Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life, from none or minor to potentially severe responses, depending on received levels, duration of exposure, behavioral context, and various other factors. The potential effects of underwater sound from active acoustic sources can potentially result in one or more of the following: temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking (Richardson *et al*., 1995; Gordon *et al*., 2004; Nowacek *et al*., 2007; Southall *et al*., 2007; Götz *et al*., 2009). The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and duration of the sound exposure. In general, sudden, high level sounds can cause hearing loss, as can longer exposures to lower level sounds. Temporary or permanent loss of hearing will occur almost exclusively for noise within an animal's hearing range. We first describe specific manifestations of acoustic effects before providing discussion specific to pile driving and removal activities.

Richardson *et al*. (1995) described zones of increasing intensity of effect that might be expected to occur, in relation to distance from a source and assuming that the signal is within an animal's hearing range. First is the area within which the acoustic signal would be audible (potentially perceived) to the animal but not strong enough to elicit any overt behavioral or physiological response. The next zone corresponds with the area where the signal is audible to the animal and of sufficient intensity to elicit behavioral or physiological responsiveness. Third is a zone within which, for signals of high intensity, the received level is sufficient to potentially cause discomfort or tissue damage to auditory or other systems. Overlaying these zones to a certain extent is the area within which masking (*i.e.*, when a sound interferes with or masks the ability of an animal to detect a signal of interest that is above the absolute hearing threshold) may occur; the masking zone may be highly variable in size.

We describe the more severe effects (*i.e.*, certain non-auditory physical or physiological effects) only briefly as we do not expect that there is a reasonable likelihood that pile driving may result in such effects (see below for further discussion). Potential effects from explosive impulsive sound sources can range in severity from effects such as behavioral disturbance or tactile perception to physical discomfort, slight injury of the internal organs and the auditory system, or mortality (Yelverton *et al*., 1973). Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to high level underwater sound or as a secondary effect of extreme behavioral reactions (*e.g.*, change in dive profile as a result of an avoidance reaction) caused by exposure to sound include neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al*., 2006; Southall *et al*., 2007; Zimmer and Tyack, 2007; Tal *et al*., 2015). The construction activities considered here do not involve the use of devices such as explosives or mid-frequency tactical sonar that are associated with these types of effects.

Threshold Shift – Note that, in the following discussion, we refer in many cases to a review article concerning studies of noise-induced hearing loss conducted from 1996-2015 (*i.e*., Finneran, 2015). For study-specific citations, please see that work. Marine mammals exposed to high-intensity sound, or to lower-intensity sound for prolonged periods, can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Finneran, 2015). TS can be permanent (permanent threshold shift (PTS)), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al*., 2007). Repeated sound exposure that leads to TTS could cause PTS. In severe cases of PTS, there can be total or partial deafness, while in most cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter, 1985).

When PTS occurs, there is physical damage to the sound receptors in the ear (*i.e.*, tissue damage), whereas TTS represents primarily tissue fatigue and is reversible (Southall *et al*., 2007). In addition, other investigators have suggested that TTS is within the normal bounds of physiological variability and tolerance and does not represent physical injury (*e.g.*, Ward, 1997). Therefore, NMFS does not consider TTS to constitute auditory injury.

Relationships between TTS and PTS thresholds have not been studied in marine mammals, and there is no PTS data for cetaceans, but such relationships are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several decibels above (a 40-dB threshold shift approximates PTS onset; *e.g.*, Kryter *et al*., 1966; Miller, 1974) that inducing mild TTS (a 6-dB threshold shift approximates TTS onset; *e.g.*, Southall *et al*. 2007). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulse sounds (such as impact pile driving pulses as received close to the source) are at least 6 dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al*., 2007). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals.

Marine mammal hearing plays a critical role in communication with conspecifics, and interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (*i.e.*, recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious. For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that occurs during a time where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts.

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin (*Tursiops truncatus*), beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*)) and three species of pinnipeds (northern elephant seal, harbor seal, and California sea lion) exposed to a limited number of sound sources (*i.e.*, mostly tones and octave-band noise) in laboratory settings (Finneran, 2015). TTS was not observed in trained spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to impulsive noise at levels matching previous predictions of TTS onset (Reichmuth *et al.*, 2016). In general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran, 2015). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. There are no data available on noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al*. (2007), Finneran and Jenkins (2012), Finneran (2015), and NMFS (2018).

Behavioral Effects – Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.*, minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.*, Richardson *et al*., 1995; Wartzok *et al*., 2003; Southall *et al*., 2007; Weilgart, 2007; Archer *et al*., 2010). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al*., 2012), and can vary depending on characteristics associated with the sound source (*e.g.*, whether it is moving or stationary, number of sources, distance from the source). Please see Appendices B-C of Southall *et al*. (2007) for a review of studies involving marine mammal behavioral responses to sound.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al*., 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a "progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial," rather than as, more generally, moderation in response to human disturbance (Bejder *et al*., 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. As noted, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al*., 1995; NRC, 2003; Wartzok *et al*., 2003). Controlled experiments with captive marine mammals have showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al*., 1997; Finneran *et al*., 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically airguns or acoustic harassment devices) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; see also Richardson *et al*., 1995; Nowacek *et al*., 2007). However, many delphinids approach low-frequency airgun source vessels with no apparent discomfort or obvious behavioral change (*e.g.*, Barkaszi *et al*., 2012), indicating the importance of frequency output in relation to the species' hearing sensitivity.

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.*, Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2005). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.*, Frankel and Clark, 2000; Costa *et al*., 2003; Ng and Leung, 2003; Nowacek *et al*.; 2004; Goldbogen *et al*., 2013a, 2013b). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g.*, foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (*e.g.*, bubble nets or sediment plumes), or changes in dive behavior. As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.*, Croll *et al*., 2001; Nowacek *et al*.; 2004; Madsen *et al*., 2006;

Yazvenko *et al*., 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Variations in respiration naturally vary with different behaviors and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.*, Kastelein *et al*., 2001, 2005, 2006; Gailey *et al*., 2007; Gailey *et al*., 2016).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Miller *et al*., 2000; Fristrup *et al*., 2003; Foote *et al*., 2004), while right whales have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al*., 2007). In some cases, animals may cease sound production during production of aversive signals (Bowles *et al*., 1994).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al*., 1995). For example, gray whales are known to change direction—deflecting from customary migratory paths—in order to avoid noise from airgun surveys (Malme *et al*., 1984). Avoidance may be short-term, with animals returning to the area once the noise has ceased (*e.g.*, Bowles *et al*., 1994; Goold, 1996; Stone *et al*., 2000; Morton and Symonds, 2002; Gailey *et al*., 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.*, Blackwell *et al*., 2004; Bejder *et al*., 2006; Teilmann *et al*., 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.*, directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus, 1996). The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (Evans and England, 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves, 2008), and whether individuals are solitary or in groups may influence the response.

Behavioral disturbance can also impact marine mammals in more subtle ways. Increased vigilance may result in costs related to diversion of focus and attention (*i.e.*, when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). These effects have generally not been demonstrated for marine mammals, but studies involving fish and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (*e.g.*, Beauchamp and Livoreil, 1997; Fritz *et al*., 2002; Purser and Radford, 2011). In addition, chronic disturbance can cause population declines through reduction of fitness (*e.g.*, decline in body condition) and subsequent reduction in reproductive success, survival, or both (*e.g.*, Harrington and Veitch, 1992; Daan *et al*., 1996; Bradshaw *et al*., 1998). However, Ridgway *et al*. (2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a five-day period did not cause any sleep deprivation or stress effects.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hour cycle). Disruption of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al*., 2007). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al*., 2007). Note that there is a difference between multi-day substantive behavioral reactions and multi-day anthropogenic activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

Stress Responses – An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.*, Seyle, 1950; Moberg, 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor.

Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress—including immune competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.*, Moberg, 1987; Blecha, 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al*., 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.*, Holberton *et al*., 1996; Hood *et al*., 1998; Jessop *et al*., 2003; Krausman *et al*., 2004; Lankford *et al*., 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker, 2000; Romano *et al*., 2002b) and, more rarely, studied in wild populations (*e.g.*, Romano *et al*., 2002a). For example, Rolland *et al*. (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as "distress." In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2003).

Auditory Masking – Sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g*., those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al*., 1995; Erbe *et al*., 2016). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (*e.g.*, snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.*, shipping, sonar, seismic exploration) in origin. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.*, signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.*, sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions.

When the coincident (masking) sound is man-made, it may be considered harassment when disrupting or altering critical behaviors. Further, under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in survival and reproduction. However, it is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect.

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.*, Clark *et al*., 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g*., Miller *et al*., 2000; Foote *et al*., 2004; Parks *et al*., 2007; Di Iorio and Clark, 2009; Holt *et al*., 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al*., 1995), through amplitude modulation of the signal, or through other compensatory behaviors (Houser and Moore, 2014). Masking can be tested directly in captive species (*e.g.*, Erbe, 2008), but in wild populations it must be either modeled or inferred from evidence of masking compensation. There are few studies addressing real-world masking sounds likely to be experienced by marine mammals in the wild (*e.g.*, Branstetter *et al*., 2013).

Masking affects both senders and receivers of acoustic signals and can potentially have long-term chronic effects on marine mammals at the population level as well as at the individual level. Low-frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, with most of the increase from distant commercial shipping (Hildebrand, 2009). All anthropogenic sound sources, but especially chronic and lower-frequency signals (*e.g.*, from vessel traffic), contribute to elevated ambient sound levels, thus intensifying masking.

Potential Effects of the AKDOT&PF's Activity – As described previously, the AKDOT&PF proposes to conduct pile driving, including impact and vibratory driving (inclusive of DTH). The effects of pile driving on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. With both types, it is likely that the pile driving could result in temporary, short-term changes in an animal's typical behavioral patterns and/or avoidance of the affected area. These behavioral changes may include (Richardson *et al*., 1995): changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses.

The biological significance of many of these behavioral disturbances is difficult to predict, even if the detected disturbances appear minor, and the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, or reproduction. However, significant behavioral modifications that could lead to effects on growth, survival, or reproduction, such as drastic changes in diving/surfacing patterns or significant habitat abandonment are extremely unlikely to result from this activity or in this area (*i.e.*, shallow waters in modified industrial areas).

Whether impact or vibratory driving, sound sources would be active for relatively short durations, with little potential for masking. Also, the frequencies output by pile driving activity are lower than those used by most species expected to be regularly present for communication or echolocation. We expect insignificant impacts from masking, and any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for vibratory and impact pile driving, and which have already been taken into account in the exposure analysis.

Anticipated Effects on Marine Mammal Habitat

The proposed activities would not result in permanent impacts to habitats used directly by marine mammals. The project would occur within the same footprint as existing marine infrastructure. The nearshore and intertidal habitat where the project would occur is an area of relatively high marine vessel traffic. Most marine mammals do not generally use the area within the footprint of the project area. The proposed activities may have potential short-term impacts to food sources such as forage fish. The proposed activities could also affect acoustic habitat (see masking discussion above), but meaningful impacts are unlikely. There are no known foraging hotspots, or other ocean bottom structures of significant biological importance to marine mammals present in the marine waters in the vicinity of the project area. Therefore, the main impact issue associated with the proposed activity would be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously. The most likely impact to marine mammal habitat occurs from pile driving effects on likely marine mammal prey (*i.e.*, fish) near where the piles are installed. Impacts to the immediate substrate during installation and removal of piles are anticipated, but these would be limited to minor, temporary suspension of sediments, which could impact water quality and visibility for a short amount of time, but which would not be expected to have any effects on individual marine mammals or the prey for marine mammals. Impacts to substrate are therefore not discussed further.

Effects to Prey – Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.*, crustaceans, cephalopods, fish, zooplankton). Marine mammal prey varies by species, season, and location and, for some, is not well documented. Here, we describe studies regarding the effects of noise on known marine mammal prey.

Fish utilize the soundscape and components of sound in their environment to perform important functions such as foraging, predator avoidance, mating, and spawning (*e.g.*, Zelick *et al*., 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fishes hear sounds using pressure and particle motion sensitivity capabilities and detect the motion of surrounding water (Fay *et al*., 2008). The potential effects of noise on fishes depends on the overlapping frequency range, distance from the sound source, water depth of exposure, and species-specific hearing sensitivity, anatomy, and physiology. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fish react to sounds which are especially strong and/or intermittent low-frequency sounds, and behavioral responses such as flight or avoidance are the most likely effects. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.*, feeding, spawning, migration), and other environmental factors. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish, although several are based on studies in support of large, multiyear bridge construction projects (*e.g.*, Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Several studies have demonstrated that impulse sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.*, Fewtrell and McCauley, 2012; Pearson *et al*., 1992; Skalski *et al*., 1992; Santulli *et al*., 1999; Paxton *et al*., 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.*, Pena *et al*., 2013; Wardle *et al*., 2001; Jorgenson and Gyselman, 2009; Cott *et al*., 2012). More commonly, though, the impacts of noise on fish are temporary.

Exposure to loud sounds with SPLs of sufficient strength have been known to cause injury to fish and fish mortality. However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al*. (2012a) showed that a TTS of 4-6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury caused by barotrauma can range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al*., 2012b; Casper *et al*., 2013).

The most likely impact to fish from pile driving activities at the project areas would be temporary behavioral avoidance of the area. The duration of fish avoidance of an area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the expected short daily duration of individual pile driving events and the relatively small areas being affected.

The following essential fish habitat (EFH) species may occur in the project area during at least one phase of their lifestage: Chum Salmon (*Oncorhynchus keta*), Pink Salmon (*O. gorbuscha*), Coho Salmon (*O. kisutch*), Sockeye Salmon (*O. nerka*), and Chinook Salmon (*O. tshawytscha*). Three creeks flowing into Port Chester are known to contain salmonids: Hemlock Creek, Trout Lake Creek, and Melanson Lake outflow (Giefer and Blossom 2020); however, adverse effects on EFH in this area are not expected.

The area impacted by the project is relatively small compared to the available habitat and does not include habitat of particular importance relative to available habitat overall. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. As described in the preceding, the potential for the AKDOT&PF's construction to affect the availability of prey to marine mammals or to meaningfully impact the quality of physical or acoustic habitat is considered to be insignificant. Effects to habitat will not be discussed further in this document.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS' consideration of "small numbers" and the negligible impact determination.

Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Take of marine mammals incidental to the AKDOT&PF's pile driving and removal activities (as well as during DTH) could occur as a result of Level B harassment only. Below we describe how the potential take is estimated. As described previously, no mortality is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g*., previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimate.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.,* 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa (rms) for continuous (*e.g.,* vibratory pile driving and DTH) and above 160 dB re 1 μPa (rms) for impulsive sources (*e.g.*, impact pile driving). The AKDOT&PF's proposed activity includes the use of continuous (vibratory pile driving, DTH) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μPa (rms) are applicable.

Level A harassment - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise. The technical guidance identifies the received levels, or thresholds, above which individual marine mammals are predicted to experience changes in their hearing sensitivity for all underwater anthropogenic sound sources, and reflects the best available science on the potential for noise to affect auditory sensitivity by:

- Dividing sound sources into two groups (*i.e.*, impulsive and non-impulsive) based on their potential to affect hearing sensitivity;
- Choosing metrics that best address the impacts of noise on hearing sensitivity, *i.e.*, sound pressure level (peak SPL) and sound exposure level (SEL) (also accounts for duration of exposure); and
- Dividing marine mammals into hearing groups and developing auditory weighting functions based on the science supporting that not all marine mammals hear and use sound in the same manner.

These thresholds were developed by compiling and synthesizing the best available science, and are provided in Table 4 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

DTH pile installation includes drilling (non-impulsive sound) and hammering (impulsive sound) to penetrate rocky substrates (Denes *et al*. 2016; Denes *et al*. 2019; Reyff and Heyvaert 2019). DTH pile installation was initially thought be a primarily non-impulsive noise source. However, Denes *et al*. (2019) concluded from a study conducted in Virginia, nearby the location for this project, that DTH should be characterized as impulsive based on Southall *et al*. (2007), who stated that signals with a >3 dB difference in sound pressure level in a 0.035-second window compared to a 1-second window can be considered impulsive. Therefore, DTH pile installation is treated as both an impulsive and non-impulsive noise source. In order to evaluate Level A harassment, DTH pile installation activities are evaluated according to the impulsive criteria and using 160 dB rms. Level B harassment isopleths are determined by applying non-impulsive criteria and using the 120 dB rms threshold which is also used for vibratory driving. This approach ensures that the largest ranges to effect for both Level A and Level B harassment are accounted for in the take estimation process.

Table 4--Thresholds identifying the onset of Permanent Threshold Shift (Auditory Injury)

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	*Cell 4* $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	*Cell 6* $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	*Cell 8* $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	*Cell 10* $L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1μPa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds, which include source levels and transmission loss coefficient.

Sound Propagation

Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$TL = B * \log_{10}(R_1/R_2)$, where

B = transmission loss coefficient (assumed to be 15)

R_1 = the distance of the modeled SPL from the driven pile, and

R_2 = the distance from the driven pile of the initial measurement.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source (20*log(range)). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log(range)). As is common practice in coastal waters, here we assume practical spreading loss (4.5 dB reduction in sound level for each doubling of distance). Practical spreading is a compromise that is often used under conditions where water depth increases as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Practical spreading was used to determine sound propagation for this project.

Sound Source Levels

The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. There are source level measurements available for certain pile types and sizes from the similar environments recorded from underwater pile driving projects in Alaska that were evaluated and used as proxy sound source levels to determine reasonable sound source levels likely result from the AKDOT&PF’s pile driving and removal activities (Table 5). Many source levels used were more conservative as the values were from larger pile sizes.

Table 5--Proposed Sound Source Levels

Method and Pile Type	SSL at 10 meters	Literature Source	Federal Register Sources[a]
Continuous (Vibratory Pile Driving and DTH)	dB rms		
16-in Steel Piles	161	Navy 2012, 2015	A, B, C, H
24-in Steel Piles	161	Navy 2012, 2015	C, D, E, H, I
24-in DTH[b]	166	Denes *et al*. 2016 (Table 72)[b]	B, C, F, G

8-in DTH[c]	166			NMFS[c]	--
Impulsive (Impact Pile Driving and DTH)	dB rms	dB SEL	dB Peak		
24-in Steel Piles	193	181	210	Navy 2015	D, H, I
24-in DTH[b]	--	154	--	Denes *et al*. 2016[b]	--
8-in DTH[c]	--	144	170	Reyff 2020	--

[a] Federal Register (FR) sources:

A: 84 FR 24490, City of Juneau Waterfront Improvement Project, Juneau, Alaska

B: 85 FR 4278, Statter Harbor Improvement Project, Auke Bay, Alaska

C: 85 FR 673, Tongass Narrows Ferry Berth Improvements, Ketchikan, Alaska

D: 85 FR 19294, Port of Alaska's Petroleum and Cement Terminal, Anchorage, Alaska

E: 84 FR 56767, Auke Bay Ferry Terminal Modifications and Improvements Project, Juneau, Alaska

F: 85 FR 18196, Gastineau Channel Historical Society Sentinel Island Moorage Float Project, Juneau, Alaska

G: 85 FR 12523, Ward Cove Cruise Ship Dock Project, Juneau, Alaska

H: 83 FR 29749, City Dock and Ferry Terminal, Tenakee Springs, Alaska

I: 82 FR 48987, Sand Point City Dock Replacement Project, Sand Point, Alaska

[b] DTH pile installation is treated as a continuous sound for Level B calculations and impulsive for Level A calculations

[C] Tension anchor installation (8-in DTH) is currently treated as DTH pile installation

Notes: DTH = down-the-hole pile installation; SSL = sound source = level; dB = decibel; rms = root mean square; SEL = sound ure level

Level A Harassment

In conjunction with the NMFS Technical Guidance (2018), in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which may result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources (such as from impact and vibratory pile driving and DTH), NMFS User Spreadsheet (2020) predicts the closest distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would not incur PTS. Inputs used in the User Spreadsheet (Tables 6 and 7), and the resulting isopleths are reported below (Table 8).

Table 6--NMFS Technical Guidance (2020) User Spreadsheet Input to Calculate PTS Isopleths for Vibratory Pile Driving

USER SPREADSHEET INPUT –Vibratory Pile Driving Spreadsheet Tab A.1 Vibratory Pile Driving Used.			
	16-in piles (removal)	24-in piles temporary (install/removal)	24-in plumb/batter piles permanent (install)
Source Level (RMS SPL)	161	161	161
Weighting Factor Adjustment (kHz)	2.5	2.5	2.5
Number of piles within 24-hr period	4	4	4
Duration to drive a single pile (min)	30	30	30
Propagation (xLogR)	15	15	15
Distance of source level measurement (meters)+	10	10	10

Table 7--NMFS Technical Guidance (2020) User Spreadsheet Input to Calculate PTS Isopleths for Impact Pile Driving

USER SPREADSHEET INPUT – Impact Pile Driving Spreadsheet Tab E.1 Impact Pile Driving Used.							
	24-in piles (permanent)	8-in pile (DTH)	8-in pile (DTH)	8-in pile (DTH)	24-in pile (DTH)	24-in pile (DTH)	24-in pile (DTH)
Source Level (Single Strike/shot SEL)	181	144	144	144	154	154	154
Weighting Factor Adjustment (kHz)	2	2	2	2	2	2	2
Number of strikes per pile	20	54,000	108,000	162,000	54,000	81,000	162,000
Minutes per pile	-	60	120	180	60	90	180
Number of piles per day	3	1	1	1	1	1	1
Propagation (xLogR)	15	15	15	15	15	15	15
Distance of source level measurement (meters)+	10	10	10	10	10	10	10

Table 8--NMFS Technical Guidance (2020) User Spreadsheet Outputs to Calculate Level A Harassment PTS Isopleths

USER SPREADSHEET OUTPUT		PTS isopleths (meters)				
		Level A harassment				
Activity	Sound Source Level at 10 m	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid	Otariid
Vibratory Pile Driving/Removal						
16-in steel pile removal	161 SPL	10.8	1.0	16.0	6.6	0.5
24-in steel pile temporary installation and removal	161 SPL	10.8	1.0	16.0	6.6	0.5
24-in steel pile permanent	161 SPL	10.8	1.0	16.0	6.6	0.5
Impact Pile Driving						
24-in steel permanent installation (3 piles a day)	181 SEL/ 193 SPL	112.6	4.0	134.1	60.3	4.4
24-in steel permanent installation (2 piles a day)	181 SEL/ 193 SPL	85.9	3.1	102.3	46.0	3.3
24-in steel permanent installation (1 piles a day)	181 SEL/ 193 SPL	54.1	1.9	64.5	29.0	2.1
DTH						
8-in steel (60 min)	144 SEL/166 SPL	35.8	1.3	42.7	19.2	1.4
8-in steel (120 min)	144 SEL/166 SPL	56.9	2.0	67.8	30.4	2.2
8-in steel (180 min)	144 SEL/166 SPL	74.5	2.7	88.8	39.9	2.9
24-in steel (60 min)	154 SEL/166 SPL	166.3	5.9	198.1	89.0	6.5

24-in steel (90 min)	154 SEL/166 SPL	218.0	7.8	259.6	116.6	8.5
24-in steel (180 min)	154 SEL/166 SPL	346.0	12.3	412.1	185.2	13.5

Level B Harassment

Utilizing the practical spreading loss model, the AKDOT&PF determined underwater noise will fall below the behavioral effects threshold of 120 dB rms for marine mammals at the distances shown in Table 9 for vibratory pile driving/removal, and DTH. With these radial distances, the largest Level B harassment zone calculated was for DTH at 11,659 m. For calculating the Level B harassment zone for impact driving, the practical spreading loss model was used with a behavioral threshold of 160 dB rms. The maximum radial distance of the Level B harassment zone for impact piling equaled 1,585 m for 24-in piles. Table 9 below provides all Level B harassment radial distances (m) during the AKDOT&PF's proposed activities.

Table 9--Radial Distances (meters) to Relevant Behavioral Isopleths

Activity	Received Level at 10 meters (m)	Level B Harassment Zone (m)*
Vibratory Pile Driving/Removal and DTH		
16-in steel piles	161 SPL	5,415 (calculated 5,412)
24-in steel piles	161 SPL	5,415 (calculated 5,412)
8-in and 24-in DTH	166 SPL	11,660 (calculated 11,659)
Impact Pile Driving		
24-in steel piles	181 SEL/ 193 SPL	1,585

* Numbers rounded up to nearest 5 meters. These specific rounded distances are for monitoring purposes rather than take estimation.

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. Potential exposures to impact pile driving, vibratory pile driving/removal and DTH noises for each acoustic threshold were estimated using group size estimates and local observational data. As shown above, distances to Level A harassment thresholds for project activities are relatively small and mitigation (*i.e.*, shutdown zones) is expected to avoid Level A harassment from these activities. Accordingly, take by Level B harassment only will be considered for this action. Take by Level B harassment are calculated differently for some species based on monthly or daily sightings data and average group sizes within the action area using the best available data.

Minke whales

There are no density estimates of minke whales available in the project area. These whales are usually sighted individually or in small groups of two or three, but there are reports of loose aggregations of hundreds of animals (NMFS 2018). Dedicated surveys for cetaceans in Southeast Alaska found that minke whales were scattered throughout inland waters from Glacier Bay and Icy Strait to Clarence Strait (Dahlheim *et al*. 2009). All sightings were of single minke whales, except for a single sighting of multiple minke whales. Anecdotal observations suggest that minke whales do not enter Port Chester, and may be more rare in the project area (L. Bethel, personal communication, June 11, 2020 2020 as cited in the application). Based on the potential for one group of a group size of three whales entering the Level B harassment zone during the project, similar to what is observed in Tongass Narrows, AKDOT&PF requested, and NMFS proposes to authorize, take of three minke whales over the 4-month project period by Level B harassment. No take by Level A harassment is proposed for authorization or anticipated to occur due to their rarer occurrence in the project area. In addition, the shutdown zones are larger than all the calculated Level A harassment isopleths for all pile driving/removal and DTH activities for cetaceans.

Humpback whales

There are no density estimates of humpback whales available in the project area. Use of Nichols Passage and Port Chester by humpback whales is common but intermittent and dependent on the presence of prey fish. No systematic studies have documented humpback whale abundance near Metlakatla. Anecdotal information from Metlakatla and Ketchikan suggest that humpback whales' utilization of the area is intermittent year-round and local mariners estimate that one to two humpback whales may be present in the Port Chester area on a daily basis during summer months (L. Bethel, personal communication, June 11, 2020 2020 as cited in the application). This is consistent with reports from Ketchikan, which suggest that humpback whales occur alone or in groups of two or three individuals and abundance is highest in August and September (84 FR 34134). However, anecdotal reports suggest that humpback whale abundance is higher and occurrence is more regular in Metlakatla. Therefore, AKDOT&PF requested and NMFS proposes that two groups of two whales, up to four individuals per day, may be taken by Level B harassment for a total of 104 humpback whales (4 whales per day * 26 days = 104 humpback whales).

Under the MMPA, humpback whales are considered a single stock (Central North Pacific); however, we have divided them here to account for DPSs listed under the ESA. Using the stock assessment from Muto *et al*. 2020 for the Central North Pacific stock (10,103 whales) and calculations in Wade *et al*. 2016; 9,487 whales are expected to be from the Hawaii DPS and 606 from the Mexico DPS. Therefore, for purposes of consultation under the ESA, we anticipate that 7 whales of the total takes would be individuals from the Mexico DPS (104 x 0.061 = 6.3 rounded to 7). No take by Level A harassment is proposed for authorization or anticipated to occur due to their large size and ability to be visibly detected in the project area if an animal should approach the Level A harassment zone as well as the size of the Level A harassment zones, which are expected to be manageable for the PSOs. The calculated Level A isopleths for low-frequency cetaceans are 113 m or less with the exception of DTH of limited duration of 24-in piles where they range from 166.3 - 346.0 m. The shutdown zones (Table 11) are larger for all calculated Level A harassment isopleths during all pile driving activities (vibratory, impact and DTH) for all cetaceans.

Killer whales

There are no density estimates of killer whales available in the project area. Three distinct eco-types occur in Southeast Alaska (resident, transient and offshore whales; Ford *et al*., 1994; Dahlheim *et al*., 1997, 2008). Dahlheim *et al*. (2009) observed transient killer whales within Lynn Canal, Icy Strait, Stephens Passage, Frederick Sound, and upper Chatham Strait. As determined during a line-transect survey by Dalheim *et al*. (2008), the greatest number of transient killer whale observed in Southeast Alaska occurred in 1993 with 32 animals seen over 2 months for an average of 16 sightings per month. Resident pods were also observed in Icy Strait, Lynn Canal, Stephens Passage, Frederick Sound and upper Chatham Straight (Dalheim *et al*. 2008). Transient killer whales are often found in long-term stable social units (pods) of 1 to 16 whales. Average pod sizes in Southeast Alaska were 6 in spring, 5 in summer, and 4 in fall. Pod sizes of transient whales are generally smaller than those of resident social groups. Resident killer whales occur in pods ranging from 7 to 70 whales that are seen in association with one another more than 50 percent of the time (Dahlheim *et al*. 2009; NMFS 2016b). In Southeast Alaska, resident killer whale mean pod size was approximately 21.5 in spring, 32.3 in summer, and 19.3 in fall (Dahlheim *et al*. 2009). Killer whales are observed occasionally during summer throughout Nichols Passage, but their presence in Port Chester is unlikely. Anecdotal local information suggests that killer whales are rarely seen within the Port Chester area, but may be present more frequently in Nichols Passage and other areas around Gravina Island (L. Bethel, personal communication, June 11, 2020 2020 as cited in the application). To be conservative AKDOT&PF requested one killer whale pod of up to 15 individuals once during the project could be taken by Level B harassment based on a pod of 12 killer whales that may be present each month similar to Tongass Narrows near Ketchikan. Additionally, a recent monitoring report for Tongass Narrows reported 10 individuals sighted and 10 Level B harassment takes of killer whales during May 2021. No take by Level A harassment is proposed for authorization or anticipated to occur to the ability to visibly detect these large whales and the small size of the Level A harassment zones. In addition, the shutdown zones are larger than all the calculated Level A harassment isopleths for all pile driving/removal and DTH activities for cetaceans.

Pacific white-sided dolphin

There are no density estimates of Pacific white-sided dolphins available in the project area. Most observations of Pacific white-sided dolphins occur off the outer coast or in inland

waterways near entrances to the open ocean. Pacific white-sided dolphins have been observed in Alaska waters in groups ranging from 20 to 164 animals, with the sighting of 164 animals occurring in Southeast Alaska near Dixon Entrance to the south of Metlakatla (Muto *et al*., 2018). In nearby Tongass Narrows, NMFS estimated that one group of 92 Pacific white-sided

dolphin (median between 20 and 164) may occur over a period of 1 year (85 FR 673). There are no records of this species occurring in Port Chester, and it is uncommon for individuals to occur in the project area. Therefore, the AKDOT&PF requested and NMFS proposes one large group of 92 dolphins may be taken by Level B harassment during the project. No take by Level A harassment is proposed or anticipated as the Level A harassment isopleths are so small.

Dall's porpoise

There are no density estimates of Dall's porpoise available in the project area. Little information is available on the abundance of Dall's porpoise in the inland waters of Southeast Alaska. Dall's porpoise are most abundant in spring, observed with lower numbers in the summer, and lowest numbers in fall. Jefferson *et al*., 2019 presents abundance estimates for Dall's porpoise in these waters and found the abundance in summer (N = 2,680, CV = 19.6 percent), and lowest in fall (N = 1,637, CV = 23.3 percent). No systematic studies of Dall's porpoise abundance or distribution have occurred in Port Chester or Nichols Passage; however, Dall's porpoises have been consistently observed in Lynn Canal, Stephens Passage, upper Chatham Strait, Frederick Sound, and Clarence Strait (Dahlheim *et al*. 2009). The species is generally found in waters in excess of 600 ft (183 m) deep, which do not occur in Port Chester. If Dall's porpoises occur in the project area, they will likely be present in March or April, given the strong seasonal patterns observed in nearby areas of Southeast Alaska (Dahlheim *et al*. 2009). Dall's porpoises are seen once a month or less within Port Chester and Nichols Passage in groups of less than 10 animals (L. Bethel, personal communication, June 11, 2020 as cited in the application).

Dall's porpoises are not expected to occur in Port Chester because the shallow water habitat of the bay is atypical of areas where Dall's porpoises usually occur. Therefore, AKDOT&PF requests and NMFS proposes one group of Dall's porpoise (15 individuals) per month, similar to what was estimated in nearby Tongass Narrows, may be taken by Level B harassment for a total of 30 Dall's porpoises during the 26 days of in-water construction (2 months * 15 porpoises per month = 30). No take by Level A harassment is proposed for authorization or anticipated to occur due to their rarer occurrence in the project area and the unlikelihood that they would enter the Level A harassment zone and remain long enough to incur PTS in the rare event that they are encountered. No take by Level A harassment is proposed for authorization or anticipated to occur, as the calculated isopleths for high-frequency cetaceans are 134 m or less during all activities except during DTH for 24-in piles of limited duration where they are 198 m – 412 m. The shutdown zones (Table 11) are larger for all calculated Level A harassment isopleths during all pile driving activities (vibratory, impact and DTH) for all cetaceans.

Harbor porpoise

There are no density estimates of Harbor porpoise available in the project area. Although there have been no systematic studies or observations of harbor porpoises specific to Port Chester or Nichols Passage, there is potential for them to occur within the project area.

Abundance data for harbor porpoises in Southeast Alaska were collected during 18 seasonal surveys spanning 22 years, from 1991 to 2012 (Dahlheim *et al*. 2015). During that study, a total of 81 harbor porpoises were observed in the southern inland waters of Southeast Alaska, including Clarence Strait. The average density estimate for all survey years in Clarence Strait was 0.02 harbor porpoises per square kilometer. There does not appear to be any seasonal variation in harbor porpoise density for the inland waters of Southeast Alaska (Dahlheim *et al*. 2015). Approximately one to two groups of harbor porpoises are observed each week in group sizes of up to 10 animals around Driest Point, located 5 km (3.1 mi) north of the project location (L. Bethel, personal communication, June 11, 2020 as cited in the application). Therefore, AKDOT&PK requests and NMFS proposes that 2 groups of 5 harbor porpoises (average group size of local sightings) per 5 days of in-water work may be taken by Level B harassment. Expressed in another way, this is an average of 2 harbor porpoise per day of in-water work. Therefore, we estimate 52 exposures over the course of the project (26 days * 2 porpoises per day = 52). No take by Level A harassment is proposed for authorization or anticipated to occur, as the calculated isopleths for high-frequency cetaceans are 134 m or less during all activities except during DTH for 24-in piles of limited duration where they are 198 m – 412 m. The shutdown zones (Table 11) are larger for all calculated Level A harassment isopleths during all pile driving activities (vibratory, impact and DTH) for all cetaceans.

Harbor Seal

There are no density estimates of harbor seals available in the project area. Harbor seals are commonly sighted in the waters of the inside passages throughout Southeast Alaska. Surveys in 2015 estimated 429 (95 percent Confidence Interval [CI]: 102–1,203) harbor seals on the northwest coast of Annettte Island, between Metlakatla and Walden Point. An additional 90 (95 percent CI: 18–292) were observed along the southwest coast of Annette Island, between Metlakatla and Tamgas Harbor (NOAA 2019). The Alaska Fisheries Science Center identifies three haulouts in Port Chester (less than a mile from the project area) and three additional haulouts north of Driest Point (3.7 mi from the project are). Abundance estimates for these haulouts are not available, but they are all denoted as having had more than 50 harbor seals at one point in time (NOAA 2020). However, local biologists report only small numbers (fewer than 10) of harbor seals are regularly observed in Port Chester. As many as 10 to 15 harbor seals may utilize Sylburn Harbor, north of Metlakatla across Driest Point (R. Cook, personal communication, June 5, 2020 as cited in the application), as a haulout location. Therefore, AKDOT&PK requests and NMFS proposes that up to 15 harbor seals may be taken by Level B harassment each day, for a total of 390 exposures (26 days * 15 seals per day = 390). No take by Level A harassment is proposed for authorization or anticipated to occur, as the calculated isopleths are 60 m or less during all activities except during DTH for 24-in piles of limited duration where they are 89 – 186 m. In addition, the shutdown zones

(Table 11) are larger for all calculated Level A harassment isopleths during all pile driving activities (vibratory, impact and DTH) for all pinnipeds.

Steller sea lion

There are no density estimates of Steller sea lions available in the project area. Steller sea lions are common within the project area; however, systematic counts or surveys have not been completed in the area directly surrounding Metlakatla. Three haulouts are located within 150 km (93 mi) of the project area (Fritz *et al*. 2016a); the nearest documented haulout is West Rock, about 45 km (28 mi) south of Metlakatla. West Rock had a count of 703 individuals during a June 2017 survey and 1,101 individuals during a June 2019 survey (Sweeney *et al*. 2017, 2019). Aerial surveys occurred intermittently between 1994 and 2015, and averaged 982 adult Steller sea lions (Fritz *et al*., 2016b). Anecdotal evidence indicate that 3 to 4 Steller sea lions utilize a buoy as a haulout near the entrance of Port Chester, about 3.2 km (2 mi) from the project location (L. Bethel, personal communication, June 11, 2020 as cited in the application). Steller sea lions are not known to congregate near the cannery in Metlakatla. Anecdotal evidence suggests that the species assemblages and abundance in Metlakatla are similar to Tongass Narrows where 20 sea lions are estimated each day during July through September. A recent monitoring report for Tongass Narrows reported 41 individual sightings of Steller sea lions with 9 takes by Level B harassment in May 2021. Therefore to be conservative, AKDOT&PF requests and NMFS proposes two groups of 10 Steller sea lions (20 Steller sea lions) may be taken by Level B harassment for a total of 520 Steller sea lions (26 days * 20 sea lions per day = 520). No take by Level A harassment is proposed or anticipated to occur as the largest Level A isopleth calculated was 13.5 m during DTH of 24-in piles and the remaining isopleths were less than 10 m. In addition, the shutdown zones (Table 11) are larger for all calculated Level A harassment isopleths during all pile driving activities (vibratory, impact and DTH) for all pinnipeds.

Table 10 below summarizes the proposed estimated take for all the species described above as a percentage of stock abundance.

Table 10--Proposed Take Estimates as a Percentage of Stock Abundance

Species	Stock (N_{EST})	Level B Harassment	Percent of Stock
Minke Whale	Alaska (N/A)	12	N/A
Humpback Whale	Central North Pacific (10,103)	104	Less than 1 percent
Killer Whale	Alaska Resident (2,347) Northern Resident (302) West Coast Transient (349)	15	0.6 [a] 5.0 [a] 4.3 [a]
Pacific White-Sided Dolphin	North Pacific (26,880)	92	Less than 1 percent
Dall's Porpoise	Alaska (83,400) [b]	30	Less than 1 percent
Harbor Porpoise	Southeast Alaska (NA)	52	NA
Harbor Seal	Clarence Strait (27,659)	390	1.4
Steller Sea Lion	Eastern U.S. (43,201)	520	1.2

[a] Take estimates are weighted based on calculated percentages of population for each distinct stock, assuming animals present would follow same probability of presence in project area.

[b] Jefferson *et al*. 2019 presents the first abundance estimates for Dall's porpoise in the waters of Southeast Alaska with highest abundance recorded in spring (N=5,381, CV= 25.4 percent), lower numbers in summer (N=2,680, CV=19.6 percent), and lowest in fall (N=1,637, CV=23.3 percent). However, NMFS currently recognizes a single stock of Dall's porpoise in Alaskan waters and an estimate of 83,400 Dall's porpoises is used by NMFS for the entire stock (Muto *et al*., 2020).

Proposed Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned) the likelihood of effective implementation (probability implemented as planned); and

2) The practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

General

The AKDOT&PF would follow mitigation procedures as outlined in their Marine Mammal Monitoring Plan and as described below. In general, if poor environmental conditions restrict visibility full visibility of the shutdown zone, pile driving installation and removal as well as DTH would be delayed.

Training

The AKDOT&PF must ensure that construction supervisors and crews, the monitoring team, and relevant AKDOT&PF staff are trained prior to the start of construction activity subject to this IHA, so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work

Avoiding Direct Physical Interaction

The AKDOT&PF must avoid direct physical interaction with marine mammals during construction activity. If a marine mammal comes within 10 m of such activity, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions, as necessary to avoid direct physical interaction.

Shutdown Zones

For all pile driving/removal and DTH activities, the AKDOT&PF would establish a shutdown zone for a marine mammal species that is greater than its corresponding Level A harassment zone (Table 11). The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). The shutdown zones are larger than all the calculated Level A harassment isopleths for all pile driving/removal and DTH activities for cetaceans and pinnipeds.

Table 11--Pile Driving Shutdown Zones during Project Activities

<table>
<tr><th rowspan="2">Activity</th><th rowspan="2">Pile Diameter</th><th rowspan="2">Pile Type or Number of Piles</th><th colspan="2">Shutdown Distance (meters)</th></tr>
<tr><th>Cetaceans</th><th>Pinnipeds</th></tr>
<tr><td>Vibratory Installation/ Removal</td><td>16- and 24-in</td><td>Battered and Plumb</td><td>50</td><td>50</td></tr>
<tr><td rowspan="3">DTH</td><td rowspan="3">24-in</td><td>Temporary</td><td>200</td><td>200</td></tr>
<tr><td>Battered, Permanent</td><td>260</td><td>120</td></tr>
<tr><td>Plumb, Permanent</td><td>415</td><td>200</td></tr>
<tr><td>DTH</td><td>8-in</td><td>Permanent</td><td>100</td><td>50</td></tr>
<tr><td rowspan="3">Impact</td><td rowspan="3">24-in</td><td>3 piles</td><td rowspan="2">135</td><td rowspan="3">100</td></tr>
<tr><td>2 piles</td></tr>
<tr><td>1 pile</td><td>100</td></tr>
</table>

Soft Start

The AKDOT&PF must use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of three strikes from the hammer at reduced energy, followed by a 30-second waiting period. Then two subsequent reduced-energy strike sets would occur. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer. Soft start is not required during vibratory pile driving and removal activities.

Based on our evaluation of the applicant's proposed measures, NMFS has preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth, requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);

- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

Monitoring Zones

The AKDOT&PF will conduct monitoring to include the area within the Level B harassment presented in Table 9. Monitoring will include all areas where SPLs are equal to or exceed 120 dB rms (for vibratory pile driving/removal and DTH) and 160 dB rms (for impact pile driving). These zones provide utility for monitoring conducted for mitigation purposes (*i.e.*, shutdown zone monitoring) by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of the Level B harassment zones enables observers to be aware of and communicate the presence of marine mammals in the project area, but outside the shutdown zone, and thus prepare for potential shutdowns of activity.

Pre-Start Clearance Monitoring

Pre-start clearance monitoring must be conducted during periods of visibility sufficient for the lead PSO to determine the shutdown zones clear of marine mammals. Pile driving and DTH may commence when the determination is made.

Visual Monitoring

Monitoring must take place from 30 minutes (min) prior to initiation of pile driving and DTH activity (*i.e.*, pre-start clearance monitoring) through 30 min post-completion of pile driving and DTH activity. If a marine mammal is observed entering or within the shutdown zones, pile driving and DTH activity must be delayed or halted. If pile driving or DTH is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone or 15 min have passed without re-detection of the animal. Pile driving and DTH activity must be halted upon observation of either a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met, entering or within the harassment zone.

PSO Monitoring Requirements and Locations

The AKDOT&PF must establish monitoring locations as described in the Marine Mammal Monitoring Plan. PSOs will be responsible for monitoring, the shutdown zones, the Level B harassment zones, and the pre-clearance zones, as well as effectively documenting Level B harassment take. As described in more detail in the Reporting section below, they will also (1) document the frequency at which marine mammals are present in the project area, (2) document behavior and group composition (3) record all construction activities, and (4) document observed reactions (changes in behavior or movement) of marine mammals during each sighting. Observers will monitor for marine mammals during all in-water pile installation/removal and DTH associated with the project. The AKDOT&PF must monitor the project area to the extent possible based on the required number of PSOs, required monitoring locations, and environmental conditions. Monitoring would be conducted by PSOs from land. For all pile driving and DTH activities, a minimum of one observer must be assigned to each active pile driving and DTH location to monitor the shutdown zones. Two PSOs must be onsite during all in-water activities and will monitor from the best vantage point. Due to the remote nature of the area, the PSOs will meet with the future designated Contractor and AKDOT&PF to determine the most appropriate observation location(s) for monitoring during pile installation and removal. These observers must record all observations of marine mammals, regardless of distance from the pile being driven or during DTH.

In addition, PSOs will work in shifts lasting no longer than 4 hrs with at least a 1-hr break between shifts, and will not perform duties as a PSO for more than 12 hrs in a 24-hr period (to reduce PSO fatigue).

Monitoring of pile driving shall be conducted by qualified, NMFS-approved PSOs. The AKDOT&PF shall adhere to the following conditions when selecting PSOs:

- PSOs must be independent (*i.e.*, not construction personnel) and have no other assigned tasks during monitoring periods;
- At least one PSO must have prior experience performing the duties of a PSO during construction activities pursuant to a NMFS-issued incidental take authorization;
- Other PSOs may substitute other relevant experience, education (degree in biological science or related field), or training;
- Where a team of three PSOs are required, a lead observer or monitoring coordinator shall be designated. The lead observer must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization; and

    - PSOs must be approved by NMFS prior to beginning any activity subject to this IHA.

The AKDOT&PF shall ensure that the PSOs have the following additional qualifications:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target;
- Experience and ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

Final report

The AKDOT&PF will submit a draft report to NMFS on all monitoring conducted under this IHA within 90 calendar days of the completion of monitoring or 60 calendar days prior to the requested issuance of any subsequent IHA for construction activity at the same location, whichever comes first. A final report must be prepared and submitted within 30 days following resolution of any NMFS comments on the draft report. If no comments are received from NMFS within 30 days of receipt of the draft report, the report shall be considered final. All draft and final marine mammal monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *ITP.Egger@noaa.gov*. The report must contain the informational elements described in the Marine Mammal Monitoring Plan and, at minimum, must include:

- Dates and times (begin and end) of all marine mammal monitoring;
- Construction activities occurring during each daily observation period, including:
    - How many and what type of piles were driven and by what method (*e.g.*, impact, vibratory, DTH);
    - Total duration of driving time for each pile (vibratory driving) and number of strikes for each pile (impact driving); and
    - For DTH, duration of operation for both impulsive and non-pulse components.
- PSO locations during marine mammal monitoring;
- Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance;
- Upon observation of a marine mammal, the following information:
    - PSO who sighted the animal and PSO location and activity at time of sighting;
    - Time of sighting;
    - Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;

    - Distance and bearing of each marine mammal observed to the pile being driven for each sighting (if pile driving and DTH was occurring at time of sighting);
    - Estimated number of animals (min/max/best);
    - Estimated number of animals by cohort (adults, juveniles, neonates, group composition etc.;
    - Animal's closest point of approach and estimated time spent within the harassment zone; and
    - Description of any marine mammal behavioral observations (*e.g.*, observed behaviors such as feeding or traveling), including an assessment of behavioral responses to the activity (*e.g.*, no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching).
- Detailed information about implementation of any mitigation (*e.g.*, shutdowns and delays), a description of specific actions that ensued, and resulting changes in behavior of the animal, if any; and
- All PSO datasheets and/or raw sightings data.

Reporting of injured or dead marine mammals

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the AKDOT&PF must report the incident to NMFS Office of Protected Resources (OPR) (*PR.ITP.MonitoringReports@noaa.gov*), NMFS (301-427-8401) and to the Alaska regional stranding network (877-925-7773) as soon as feasible. If the death or injury was clearly caused by the specified activity, the AKDOT&PF must immediately cease the specified activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of this IHA. The AKDOT&PF must not resume their activities until notified by NMFS. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

As stated in the proposed mitigation section, shutdown zones that are larger than the Level A harassment zones will be implemented, which, in combination with the fact that the zones are small to begin with, is expected to avoid the likelihood of Level A harassment for marine mammals species.

Exposures to elevated sound levels produced during pile driving activities may cause behavioral responses by an animal, but they are expected to be mild and temporary. Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.,* Thorson and Reyff, 2006; Lerma, 2014). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. These reactions and behavioral changes are expected to subside quickly when the exposures cease.

During all impact driving, implementation of soft start procedures and monitoring of established shutdown zones will be required, significantly reducing the possibility of injury. Given sufficient notice through use of soft start (for impact driving), marine mammals are expected to move away from an irritating sound source prior to it becoming potentially injurious. In addition, PSOs will be stationed within the action area whenever pile driving/removal and DTH activities are underway. Depending on the activity, the AKDOT&PF will employ the use of two PSOs to ensure all monitoring and shutdown zones are properly observed.

The project would likely not permanently impact any marine mammal habitat since the project will occur within the same footprint as existing marine infrastructure.

The nearshore and intertidal habitat where the project will occur is an area of relatively high marine vessel traffic. The closest pinniped haulouts are used by harbor seals and are less than a mile from the project area; however, impacts to fitness of individuals is likely low (due to short duration of the project) and would not produce population-level impacts. There are no other biologically important areas for marine mammals near the project area. In addition, impacts to marine mammal prey species are expected to be minor and temporary. Overall, the area impacted by the project is very small compared to the available habitat around Metlakatla. The most likely impact to prey will be temporary behavioral avoidance of the immediate area. During pile driving/removal and DTH activities, it is expected that fish and marine mammals would temporarily move to nearby locations and return to the area following cessation of in-water construction activities. Therefore, indirect effects on marine mammal prey during the construction are not expected to be substantial.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality is anticipated or authorized;
- No take by Level A harassment is expected or authorized;
- Minimal impacts to marine mammal habitat/prey are expected;
- The action area is located and within an active marine commercial area;
- Anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior; and
- The required mitigation measures (*i.e.* shutdown zones) are expected to be effective in reducing the effects of the specified activity.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Take of six of the marine mammal stocks proposed will comprise at most approximately 1.4 percent or less of the stock abundance. There are no official stock abundances for harbor porpoise and minke whales; however, as discussed in greater detail in the **Description of Marine Mammals in the Area of Specified Activities**, we believe for the abundance information that is available, the estimated takes are likely small percentages of the stock abundance. For harbor porpoise, the abundance for the Southeast Alaska stock is likely more represented by the aerial surveys that were conducted as these surveys had better coverage and were corrected for observer bias. Based on this data, the estimated take could potentially be approximately 4 percent of the stock abundance. However, this is unlikely and the percentage of the stock taken is likely lower as the proposed take estimates are conservative and the project occurs in a small footprint compared to the available habitat in Southeast Alaska. For minke whales, in the northern part of their range they are believed to be migratory and so few minke whales have been seen during three offshore Gulf of Alaska surveys that a population estimate could not be determined. With only twelve proposed takes for this species, the percentage of take in relation to the stock abundance is likely to be very small.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

In order to issue an IHA, NMFS must find that the specified activity will not have an "unmitigable adverse impact" on the subsistence uses of the affected marine mammal species or stocks by Alaskan Natives. NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103 as an impact resulting from the specified activity: (1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) Causing the marine mammals to abandon or avoid hunting areas; (ii) Directly displacing subsistence users; or (iii) Placing physical barriers between the marine mammals and the subsistence hunters; and (2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

The project area does not spatially overlap any known subsistence hunting. The project area is a developed area with regular marine vessel traffic. However, the AKDOT&PF plans to provide advance public notice of construction activities to reduce construction impacts on local residents, adjacent businesses, and other users of Port Chester and nearby areas. This will include notification to nearby Alaska Native tribes that may have members who hunt marine

mammals for subsistence. Currently, the Metlakatla Indian Community does not authorize the harvest of marine mammals for subsistence use (R. Cook, personal communication, June 5, 2020 as cited in the application).

The proposed project is not likely to adversely impact the availability of any marine mammal species or stocks that are commonly used for subsistence purposes or to impact subsistence harvest of marine mammals in the region because construction activities are localized and temporary; mitigation measures will be implemented to minimize disturbance of marine mammals in the project area. Accordingly, NMFS has preliminarily determined that there will not be an unmitigable adverse impact on subsistence uses from the AKDOT&PF's proposed activities.

Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with the Alaska Regional Office (AKRO).

NMFS is proposing to authorize take of the Mexico DPS of humpback whales, which are listed under the ESA. The Permit and Conservation Division has requested initiation of Section 7 consultation with the AKRO for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to the AKDOT&PF for conducting for the proposed pile driving and removal activities as well as DTH during construction of the Metlakatla Seaplane Facility Refurbishment Project, Metlakatla, Alaska for one year, beginning August 2021, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*.

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHA for the proposed pile driving and removal activities as well as DTH during construction of the Metlakatla Seaplane Facility Refurbishment Project. We also request at this time, comments on the potential for Renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent Renewal IHA.

On a case-by-case basis, NMFS may issue a one-time, 1-year Renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical, or nearly identical, activities as described in the **Description of Proposed Activities** section of this notice is planned or (2) the activities as described in the **Description of Proposed Activities** section of this notice would not be completed by the time the IHA expires and a Renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed Renewal IHA effective date (recognizing that the Renewal IHA expiration date cannot extend beyond one year from expiration of the initial IHA).

- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested Renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.*, reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take); and

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized.

Upon review of the request for Renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: June 23, 2021.

Catherine Marzin,

Acting Director, Office of Protected Resources,

National Marine Fisheries Service.

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